Statistical Decision Making (MGBU 2142 -R11/R13)

Instructor: Dr. Sarah J. Wu
Email: jiwu@fordham.edu
Office: Hughes Hall 511
Office hours: T/F 1:00-2:00pm

I. Course objectives: At the end of the semester, students are expected to achieve a good knowledge of hypothesis testing procedure and be able to manually conduct one population mean/proportion test, two populations mean/proportion comparison, analysis of variance, regression analysis, chi-square independence test. Students should also be able to use statistical software (EXCEL) to test their own hypotheses for decision-making, interpret the output, and draw managerial conclusions based upon the statistical findings.

II. Text and Course Materials


Install software on your computer/laptop, get your unique access code for the courseware, and enroll in the course.

Lecture notes can be found under Progress Report → My tools → Course Materials once you log into the software.

More information and resources (e.g. training video) for students are available at:
http://www.hawkeslearning.com/Students.htm
http://www.hawkeslearning.com/Students/StudentTraining.htm

If you experience any technical difficulty, please find the contact information at:
http://support.hawkeslearning.com/supportcenter/

III. Basis for Final Grade

<table>
<thead>
<tr>
<th>Assessment</th>
<th>% of Final Grade</th>
<th>Final Letter Grade</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework (15)</td>
<td>30%</td>
<td>A/A-</td>
<td>[90, 100]</td>
</tr>
<tr>
<td>Exam 1-4 (drop the lowest)</td>
<td>60%</td>
<td>B-/B/B+</td>
<td>[80, 90]</td>
</tr>
<tr>
<td>Project</td>
<td>10%</td>
<td>C-/C/C+</td>
<td>[70, 80]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>[60, 70]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>[0, 60]</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
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</tbody>
</table>

Notes: (1) All exams are open book and open notes.
(2) No makeups for the scheduled exams without a valid excuse.
(3) The lowest score of the four exams will be dropped in calculating the final grade.
(4) Project is group work; three or four students form a group by the end of the second week. Each group will be asked to analyze a dataset and submit a report
discussing what kind of information/inference can be obtained from the data and how they are useful to decision makers. In the report, the students MUST cover the following sections: overview/summary, analyses to be conducted and the rationale of performing those analyses; analysis results with EXCEL output attached, the meaning of the findings and the implications for decision-making. Each group will make a short presentation at the end of the semester. The project will be evaluated based on the presentation, the comprehensiveness and accuracy of the analyses, and the clarity of the write-up. Each group is encouraged to meet with the instructor at least once a semester to talk about the progress of the project.

(5) No extra credit will be given throughout the semester. 40% of the grade (homework and group project) is set to reward the effort a student puts into this course; and the rest 60% of the grade reflects a student's performance in the exams.

(6) Please understand that the instructor cannot grant the grade as a student requests. Taking all exams and finishing all homework do not necessarily mean that one would get an "A" in this class. Getting "A" in other classes does not automatically buy one an "A" in this class as well. The final grade will be ONLY based on one's effort and performance in this class.

IV. Course Policies

1. Attendance is highly recommended to understand the course materials. Attendance will be randomly taken, but not count for credit in the final grade.

2. Students are expected to arrive to class on time and are expected to remain in the classroom for the full time period. Turn cell phone off.

3. The instructor will upload the course materials (i.e., lecture notes) into the courseware. Please download it and bring it to the class. Please note that the lecture notes are not complete, and students will need to work with the instructor to complete it in class.

4. Feel free to stop me and ask questions during the lecture. Do not wait until the end of the class as one might forget the question.

5. Please practice professional and courteous deportment during class. Students are not allowed to use laptop unless for notes-taking purpose. Surfing, texting, tweeting, facebooking, playing games, sleeping, or any other similar activity will distract you and your classmates, and will not be tolerated.

6. Students who missed a class should first review the lesson in the courseware under "INSTRUCT" mode, work on the lecture notes, and then approach the instructor with specific questions.

7. Students should do practice questions in the courseware under "PRACTICE" mode for each topic. This mode has an interactive tutor function for step-by-step assistance and solutions.

8. Online homework will be assigned regularly for most of the topics. Each student will do the assigned homework in "CERTIFY" mode, which allows for unlimited attempts to demonstrate mastery of the topic (i.e., be certified). A student has to be certified to earn the credit for homework. Each homework must be completed by midnight on the due date specified in the courseware; otherwise, penalties will be applied.

9. Absences for the exam will be excused only if they are due to serious illness, death in the student's immediate family, or required participation in a university-
sponsored event. All requests for makeup exams under those conditions must be processed through the class dean who will notify the instructor. Such requests must be made in writing within one week of an absence; otherwise, the student will lose the opportunity to makeup the exam.

10. If you are a university athlete, please provide your scheduled events. If there is a conflict with exams or homework submission, there will be an alternative arrangement.

11. If you have a physical/learning disability, please contact Disability Office (www.fordham.edu/dss) and speak with me about appropriate accommodation at the beginning of the semester.

**Tentative Schedule**
(subject to revision, depending on progress)

<table>
<thead>
<tr>
<th>Date</th>
<th>Chapter</th>
<th>Topics</th>
<th>Homework</th>
<th>Due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/30</td>
<td></td>
<td>Syllabus and Introduction</td>
<td></td>
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</tr>
<tr>
<td>9/3</td>
<td>10.1-10.3</td>
<td>Hypothesis testing procedure</td>
<td>#1</td>
<td>9/6</td>
</tr>
<tr>
<td>9/6</td>
<td>10.4</td>
<td>One population mean test (z)</td>
<td>#2</td>
<td>9/10</td>
</tr>
<tr>
<td>9/10</td>
<td>10.4</td>
<td>One population mean test (t)</td>
<td>#3</td>
<td>9/13</td>
</tr>
<tr>
<td>9/13</td>
<td>10.4</td>
<td>p value approach</td>
<td>#4</td>
<td>9/17</td>
</tr>
<tr>
<td>9/17</td>
<td>10.6</td>
<td>Confidence interval approach</td>
<td></td>
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<tr>
<td>9/20</td>
<td>10.7</td>
<td>One population proportion test</td>
<td>#5 &amp; #6</td>
<td>9/24</td>
</tr>
<tr>
<td>9/24</td>
<td></td>
<td>Review for Chapter 10</td>
<td></td>
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<tr>
<td>9/27</td>
<td></td>
<td>Exam #1</td>
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<tr>
<td>10/1</td>
<td>11.1</td>
<td>Two population mean comparison (z)</td>
<td>#7</td>
<td>10/4</td>
</tr>
<tr>
<td>10/4</td>
<td>11.2</td>
<td>Two population mean comparison (t)</td>
<td>#8</td>
<td>10/8</td>
</tr>
<tr>
<td>10/8</td>
<td>11.3</td>
<td>Paired difference test</td>
<td>#9</td>
<td>10/11</td>
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<tr>
<td>10/11</td>
<td>11.4</td>
<td>Two population proportion comparison</td>
<td>#10</td>
<td>11/15</td>
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<tr>
<td>10/15</td>
<td></td>
<td>Review for Chapter 11</td>
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<tr>
<td>10/18</td>
<td></td>
<td>Exam #2</td>
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<tr>
<td>10/22</td>
<td>12.1-12.2</td>
<td>Intro ANOVA and variance</td>
<td>#11</td>
<td>10/29</td>
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<tr>
<td>10/25</td>
<td>12.3-12.4</td>
<td>ANOVA and F-test</td>
<td>#11</td>
<td>10/29</td>
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<tr>
<td>10/29</td>
<td>15.1-15.2</td>
<td>Chi-square goodness of fit</td>
<td>#12</td>
<td>11/1</td>
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<tr>
<td>11/1</td>
<td>15.3</td>
<td>Independence test</td>
<td>#13</td>
<td>11/5</td>
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<tr>
<td>11/5</td>
<td></td>
<td>Review for Chapter 12 &amp; 15</td>
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<tr>
<td>11/8</td>
<td></td>
<td>Exam #3</td>
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<tr>
<td>11/12</td>
<td></td>
<td>Lab (software)</td>
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<tr>
<td>11/15</td>
<td>13.1-13.5</td>
<td>Estimate regression line</td>
<td>#14</td>
<td>11/19</td>
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<tr>
<td>11/19</td>
<td>13.8-13.9</td>
<td>Test for regression coefficient</td>
<td>#15</td>
<td>11/22</td>
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<tr>
<td>11/22</td>
<td>13.10</td>
<td>Model Prediction</td>
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<tr>
<td>11/26</td>
<td></td>
<td>Lab (software)</td>
<td></td>
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<tr>
<td>12/3</td>
<td></td>
<td>Project Discussion</td>
<td></td>
<td>Project due</td>
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<tr>
<td>12/6</td>
<td></td>
<td>Review for Chapter 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/13</td>
<td></td>
<td>Exam #4</td>
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GET STARTED USING HAWKES

Before Getting Started:

1. Hawkes CourseID: FORDHAMDBS
2. Instructor Name:
3. Course Section:

NOTE: Do NOT purchase used software (from other students or online vendors). The software is licensed to the original purchaser only.

Step 1: Install the Software

Option 1- PC Users Only: Use the installation disks.
1. Insert CD#1 in your computer and follow the directions in the Setup Wizard.
2. When prompted for the Hawkes CourseID enter: FORDHAMDBS

Option 2- PC or Mac Users: Download from Hawkes website.
1. Go to hawkeslearning.com and select "Download the software".
2. Choose the product to download.
3. Select either Student Install for PCs or Student Install for Mac and then "Run".
4. When prompted for the Hawkes CourseID enter: FORDHAMDBS

Step 2: Get Your Access Code

1. Go to hawkeslearning.com
2. Click “Get Your Access Code”
3. Select:
   a. Register: If you have already purchased your materials and need to register the license number on the yellow sticker
   b. Purchase: If you need to purchase an Access Code.
4. Fill out the form with all of the necessary information.
5. Select “Submit” to receive your personalized Access Code.
6. Copy the Access Code as it will be necessary to type or paste the code into the software in STEP 3

Step 3: Enroll in your course

1. Double click on the Hawkes Learning Systems icon from your desktop.
2. Type or paste in your code and select “OK.”
3. Save your Access Code when prompted to a USB memory stick or to your computer for future use.
   ** Once the Access Code is saved, you will be able to use the “Load from file” option.
4. Choose your instructor and section from the drop down menus. Select “Enroll”.

You are now ready to complete assignments for this course!

TIP: Watch the Video Tour, located under the Help Menu, to learn more about the software.

Step 4: Complete Assignments

The Certify Mode is your assignment. Once you have completed a lesson, a certification code will appear.

Save this code!

- If connected to internet, you will automatically receive credit in your instructor’s grade book.
- If not connected to the internet, you will need to submit the code to the grade book:
  1. Save the certification code to a memory stick
  2. From a computer with internet access, go to course.hawkeslearning.com/FORDHAMDBS
  3. Select the Submit Certificate(s) tab
  4. Browse to the location where the certification code was saved and click Submit Certificate

***Be sure to submit the certification code ON or BEFORE the due date to receive FULL credit

View Your Progress Report

Visit course.hawkeslearning.com/FORDHAMDBS to find:

✓ Homework due dates
✓ Grade information
✓ Course materials
✓ Communication center

Questions? Visit hawkeslearning.com/support.
INTRODUCTION

I. Review

1. Population vs. Sample

2. Measure a variable – four scales of measurement:
   - Nominal scale – use numbers only for the purpose of identifying membership in a group or category.
   - Ordinal scale – numbers represent “greater than” or “less than” measurements, such as preferences or ranking.
   - Interval scale – not only includes “greater than” or “less than” relationships, but also has a unit of measurement that permits us to describe how much more or less one object possesses than another.
   - Ratio scale – similar to the interval scale, but has an absolute zero and multiples are meaningful.

   Scales of measurement determines appropriate methods for data description and analysis.

3. Central limit theorem – for large, simple random samples (n>=30) from a population that is not normally distributed, the sampling distribution (i.e., the probability distribution of a sample statistic) of the mean will be approximately normal. The sampling distribution will more closely approach the normal distribution as the sample size is increased.

II. Preview

1. A portfolio manager was analyzing the price-earnings ratio for this year’s performance. His boss said that the average price-earnings ratio was 20 for the many stocks, which his firm had traded, but he felt that figure was too high. Is there a way to prove or disprove his thought?

2. Do you believe that there really exists a significant difference between good performing and poor performing companies in terms of the price-earnings (P/E) ratio? How to find this out?
3. The management team of NIKE is to undertake a study examining the effect of three assembly methods on the output of workers at its shoe factory. Does the kind of the assembly method affect workers' productivity?

4. How do you know a student's college location (rural or city) is related to his/her work location (rural or city)? How do you know whether there exists some relationship between driver behavior (stop or not by the stop sign) and the type of vehicles being driven?

5. The general manager of Macy's believes that experience is the most important factor in determining the level of success of a salesperson. How to prove the existence of such relationship? Can a professor predict a student's final grade for his/her course based on the number of hours a student studied during the semester?